

What is claimed is:

1. A control method of an automatic transmission, for controlling the automatic transmission by using a hydraulic circuit comprising:

a mechanical pump driven by an internal combustion engine;

a motor pump; and

an oil passage by which a fluid is supplied from the mechanical pump and the motor pump,

wherein the motor pump is driven when a change of state in the automatic transmission and the hydraulic circuit is detected while the internal combustion engine is revolving without any aid of a starter so that the mechanical pump supplies the fluid to the oil passage.

2. The control method of an automatic transmission according to claim 1, wherein

the automatic transmission includes a friction element that moves from a disengaged state to an engaged state and from an engaged state to a disengaged state according to a pressure of the fluid supplied from the oil passage; and

the motor pump is driven when a change of an input-side torque exceeding a predetermined value is detected in the automatic transmission.

3. The control method of an automatic transmission according to claim 1, wherein the automatic transmission

includes a torque converter, and a lock-up clutch for directly connecting an input shaft and an output shaft of the torque converter with each other in accordance with a pressure of the fluid supplied from the oil passage; and

the motor pump is driven when a change that a difference in a number of revolutions between the input shaft and the output shaft exceeds a predetermined value is detected in the automatic transmission.

4. The control method of an automatic transmission according to claim 3, wherein the motor pump is driven when a directly connected state of the input shaft and the output shaft and a change such that the difference in the number of revolutions exceeding the predetermined value are detected in the automatic transmission.

5. The control method of an automatic transmission according to claim 1, wherein

the automatic transmission includes a friction element for shifting a gear position by transitioning from a disengaged state to an engaged state or from an engaged state to a disengaged state, and a lubricating circuit for lubricating the friction element with the fluid supplied from the oil passage; and

the motor pump is driven when a shift of a gear position is detected in the automatic transmission.

6. The control method of an automatic transmission according to claim 1, wherein

the automatic transmission includes a plurality of friction elements for transiting from one of a disengaged state and an engaged state to the other state in accordance with a pressure of the fluid supplied from the oil passage;

the hydraulic circuit includes a manual valve for switching the plurality of oil passages for supplying the fluid to the plurality of friction elements in accordance with a command of changing a shift position; and

the motor pump is driven when a change of a fluid temperature becomes lower than a predetermined value is detected in the hydraulic circuit.

7. The control method of an automatic transmission according to claim 1, wherein

the automatic transmission includes a plurality of friction elements for transiting from one of a disengaged state and an engaged state to the other state in accordance with a pressure of the fluid supplied from the oil passage;

the hydraulic circuit includes a manual valve for switching the plurality of oil passages for supplying the fluid to the plurality of friction elements in accordance with a command of changing a shift position; and

the motor pump is driven when a change such that the oil passages are switched by the manual valve is detected in the hydraulic circuit.

8. The control method of an automatic transmission according to claim 1, wherein the automatic transmission includes a warmer for warming the fluid supplied from the oil passage; and

the motor pump is driven when a change such that a fluid temperature becomes lower than a predetermined value is detected in the automatic transmission.

9. The control method of an automatic transmission according to claim 1, wherein the automatic transmission includes a cooler for cooling the fluid supplied from the oil passage; and

the motor pump is driven when a change such that a fluid temperature exceeds a predetermined value is detected in the automatic transmission.

10. The control method of an automatic transmission according to claim 1, for controlling the automatic transmission attached to a vehicle including an idle stop system.

11. A control device of an automatic transmission, for controlling the automatic transmission, comprising:

a hydraulic circuit including:

a mechanical pump driven by an internal combustion engine;

a motor pump; and

an oil passage to which a fluid is supplied from the mechanical pump and the motor pump; and

driving control means for driving the motor pump when a change of state in the automatic transmission and the hydraulic circuit is detected while the internal combustion engine revolves without any aid of a starter so that the mechanical pump supplies the fluid to the oil passage.

12. The control device of an automatic transmission according to claim 11, wherein the automatic transmission includes a friction element that moves from one of a disengaged state and an engaged state to the other state in accordance with a pressure of the fluid supplied from the oil passage; and

the driving control means drives the motor pump when a change such that an input-side torque exceeds a predetermined value is detected in the automatic transmission.

13. The control device of an automatic transmission according to claim 11, wherein the automatic transmission includes a torque converter and a lock-up clutch for directly connecting an input shaft and an output shaft of the torque converter to each other in accordance with a pressure of the fluid supplied from the oil passage; and

the driving control means drives the motor pump when a

difference in a number of revolutions between the input shaft and the output shaft exceeds a predetermined value is detected in the automatic transmission.

14. The control device of an automatic transmission according to claim 13, wherein the driving control means drives the motor pump when a directly connected state of the input shaft and the output shaft and a change in a number of revolutions exceeds the predetermined value are detected in the automatic transmission.

15. The control device of an automatic transmission according to claim 11, wherein the automatic transmission includes a friction element for shifting a gear position by transitioning from one of a disengaged state and an engaged state to the other state, and a lubricating circuit for lubricating the friction element with the fluid supplied from the oil passage; and

the driving control means drives the motor pump when a shift of the gear position is detected in the automatic transmission.

16. The control device of an automatic transmission according to claim 11, wherein

the automatic transmission includes a plurality of friction elements for transiting from one of a disengaged state and an engaged state to the other state in accordance

with a pressure of the fluid supplied from the oil passage;

the hydraulic circuit includes a manual valve for switching the plurality of oil passages for supplying the fluid to the plurality of friction elements in accordance with a command to change a shift position; and

the driving control means drives the motor pump upon detection of a fluid temperature that is lower than a predetermined temperature in the hydraulic circuit.

17. The control device of an automatic transmission according to claim 11, wherein

the automatic transmission includes a plurality of friction elements for transiting from one of a disengaged state and an engaged state to the other state in accordance with a pressure of the fluid supplied from the oil passage;

the hydraulic circuit includes a manual valve for switching a plurality of the oil passages for supplying the fluid to the plurality of friction elements in accordance with a command of changing a shift position; and

the driving control means drives the motor pump when a change such that the oil passages are switched by the manual valve is detected in the hydraulic circuit.

18. The control device of an automatic transmission according to claim 11, wherein

the automatic transmission includes a warmer for warming the fluid supplied from the oil passage; and

the driving control means drives the motor pump when a change in a fluid temperature becomes lower than a predetermined value is detected in the automatic transmission.

19. The control device of an automatic transmission according to claim 11, wherein the automatic transmission includes a cooler for cooling the fluid supplied from the oil passage; and

the driving control means drives the motor pump when a change of a fluid temperature exceeding a predetermined value is detected in the automatic transmission.

20. The control device of an automatic transmission according to claim 11, for controlling the automatic transmission attached to a vehicle including an idle stop system.